

Message

**From:** Daly, Eric [Daly.Eric@epa.gov]  
**Sent:** 12/2/2015 5:33:23 PM  
**To:** Nwosu, Bernard [Ben.Nwosu@WestonSolutions.com]  
**Subject:** Re: CRU Soil Data for cleanup value calculations and updated Radiological data tables

For all three sites we are using both SAT and RST3 data. I'm away from laptop but I am looking to see highest number for each nuclide from both. So if Ra-226 is 150 for SAT and 140 for RST, the 150 is what we will use for our list. As far as individual documents, we can highlight the individual high numbers. Meaning both Ra-226 values will be highlighted in each individual document. Just to make sure, the last NFB figure with combined soil values has the 21 day numbers for RST right?

Regards,

Eric

"We must, indeed, all hang together, or assuredly we shall all hang separately", Benjamin Franklin  
 Eric M. Daly  
 On-Scene Coordinator/Radiological Response Specialist  
 US Environmental Protection Agency- Region II  
 ERRD/RPB/PPS  
 2890 Woodbridge Avenue  
 Edison, NJ 08837  
[daly.eric@epa.gov](mailto:daly.eric@epa.gov)  
 732-321-4350

On Dec 2, 2015, at 11:46 AM, Nwosu, Bernard <[Ben.Nwosu@WestonSolutions.com](mailto:Ben.Nwosu@WestonSolutions.com)> wrote:

I was not sure if you wanted to use only RST data or a combination of both. Please see table below.

Please note: After reviewing Table 8A and 9 for each site, I have revised all of them specifically for consistency in the footnotes. In addition, I have eliminated all prior versions of these tables and retained these current versions as Tables 8A and 9. Tables 8A-1 and 9A no longer exist. Upon providing EPA SSAL for CRU, I will make the final updates to the Table 8A and 9. Please let me know if all this is clear to you.

RST 3/SAT Data-Canadian Radium & Uranium Site				
Radioisotope	RST 3		SAT	
	Value	Total	Value	Total
	(pCi/g)	Uncertainty	(pCi/g)	Uncertainty
Thorium-228	Higher value in SAT data		1.07	0.165
Thorium-230			83.3	7.27
Radium-228			1.79	0.963
Thorium-232	1.14	0.214	Higher value in RST 3 data	
Uranium-233/234	3.26	0.44		
Uranium-235/236	0.307	0.122		
Uranium-238	1.83	0.301		
Radium-226*	129	13.6	Not 21-days ingrowth	

Ac-228	1.23	0.28
Bi-212	15.4	3.85
Bi-214	120	12.6
Cesium-137	NA	NA
K-40	18.1	5.86
Pb-210	99.7	17.7
Pb-212	1.26	0.217
Pb-214	129	13.5
Tl-208	0.466	0.174

Not Analyzed

Thanks,

Ben Nwosu  
Weston Solutions, Inc.  
RST3/ED2

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**From:** Daly, Eric [<mailto:Daly.Eric@epa.gov>]  
**Sent:** Wednesday, December 02, 2015 11:21 AM  
**To:** Nwosu, Bernard  
**Subject:** RE: CRU Soil Data for cleanup value calculations

Hi Ben. The first email contains the same info and document as the second email, correct? Also, below you left out SAT data that is lower than that of RST3 but you listed all the RST3 data?

In the 8A document, second page, the second Ra-226 preliminary results are still present as well as the additional Ra-228.

Thanks

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**From:** Nwosu, Bernard [<mailto:Ben.Nwosu@WestonSolutions.com>]  
**Sent:** Wednesday, December 02, 2015 10:00 AM  
**To:** Daly, Eric <[Daly.Eric@epa.gov](mailto:Daly.Eric@epa.gov)>  
**Subject:** RE: CRU Soil Data for cleanup value calculations

Please see attached.

SAT Data - Canadian Radium & Uranium Site			
Radioisotope	Value (pCi/g)	Qualifier	Total Uncertainty
Uranium-238	Higer value in RST 3 data		
Thorium-230	83.3		7.27
Uranium-233/234	Higer value in RST 3 data		
Radium-226	135		14.1
Thorium-232	Higer value in RST 3 data		
Radium-228	1.79		0.963

Thorium-228	1.07	0.165
Uranium-235/236	Higer value in RST 3 data	

RST 3 Data - Canadian Radium & Uranium Site			
Radioisotope	Value (pCi/g)	Qualifier	Total Uncertainty
Thorium-228	1.04		0.205
Thorium-230	42		3.71
Thorium-232	1.14		0.214
Uranium-233/234	3.26		0.44
Uranium-235/236	0.307		0.122
Uranium-238	1.83		0.301
Ac-228	1.23		0.28
Bi-212	15.4		3.85
Bi-214	120		12.6
Cesium-137	NA		NA
K-40	18.1		5.86
Pb-210	99.7		17.7
Pb-212	1.26		0.217
Pb-214	129		13.5
Tl-208	0.466		0.174
Radium-226*	129		13.6
Radium-228	1.23		0.28

Ben Nwosu  
Weston Solutions, Inc.  
RST3/ED2

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**From:** Daly, Eric [<mailto:Daly.Eric@epa.gov>]  
**Sent:** Tuesday, December 01, 2015 7:29 PM  
**To:** Nwosu, Bernard  
**Subject:** CRU Soil Data for cleanup value calculations

Hi Ben:

Hi. I have marked up the CRU soil data. This is just to get values for Lyndsey, Can you please review the soil data and verify I highlighted the highest values for each nuclide. Then if you could, please give me the highest value out of

each document. Meaning, I highlighted the highest nuclide in each document but I need the highest value overall for each nuclide. Also, I noticed that we have an extra Cs-137 on page 2 of Table 8A. Please delete that from your final version. Lastly, we can remove the non-21 day Ra-226 from all three rad site tables. The Ra-226 21 day is the final value.

Thanks

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**From:** Daly, Eric  
**Sent:** Tuesday, December 01, 2015 4:21 PM  
**To:** 'Nwosu, Bernard' <Ben.Nwosu@WestonSolutions.com>; Nguyen, Lyndsey <Nguyen.Lyndsey@epa.gov>  
**Subject:** Pending Information Requests

Attached is #4 from the list below. I should be able to do #3. Even though Lyndsey performed the swipe sampling, I was with her during the process.

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**From:** Nwosu, Bernard [mailto:Ben.Nwosu@WestonSolutions.com]  
**Sent:** Monday, November 30, 2015 10:31 AM  
**To:** Nguyen, Lyndsey <Nguyen.Lyndsey@epa.gov>; Daly, Eric <Daly.Eric@epa.gov>  
**Subject:** RE: HTC Data-Recap and Pending Information Requests

Lyndsey,

Please see my response in red/blue highlight below.

**Information request still pending:**

- 1) Site-specific action level for radiological parameters – Canadian Radium and Uranium.
- 2) Site-specific action level for Bi-210, Pb-210, and Th-234, which were not included in the list received – Holy Trinity Cemetery Site.
- 3) Swipe sample locations Niagara Falls Blvd and Holy Trinity – Lyndsey (I sent you a prior email for this)
- 4) Swipe sample locations Canadian Radium – Eric (Please print out the maps and indicate the sample locations with a dot or 'x' and write the sample number next to it. Please scan marked up versions of the maps back to me and I will update the map with the results)

Please let me know if you have any questions.

Thank you.

Ben Nwosu  
Weston Solutions, Inc.  
RST3/ED2

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**From:** Nguyen, Lyndsey [mailto:Nguyen.Lyndsey@epa.gov]  
**Sent:** Monday, November 23, 2015 12:52 PM  
**To:** Daly, Eric; Nwosu, Bernard  
**Subject:** Re: HTC Data-Recap

Howdy Ben,

I've answered the email below in yellow the best that I could. Also, could you provide me the TestAmerica report?

Thanks a bunch!

Lyndsey

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**From:** Daly, Eric  
**Sent:** Monday, November 23, 2015 9:02 AM  
**To:** Nwosu, Bernard; Nguyen, Lyndsey  
**Subject:** HTC Data-Recap

Good Afternoon Ben:

FYI, Lyndsey is out of the office all week. She may be able to comment here or there but we have not forgotten your questions.

To recap, I believe Ben replied to Lyndsey's questions on November 18<sup>th</sup> (See history below). I am not sure if Lyndsey has any follow up questions on those answers. I know the answers to Ben's action level questions below from last Thursday are still pending.

Thanks to you both.

**From:** Nwosu, Bernard [<mailto:Ben.Nwosu@WestonSolutions.com>]  
**Sent:** Thursday, November 19, 2015 3:33 PM  
**To:** Daly, Eric <[Daly.Eric@epa.gov](mailto:Daly.Eric@epa.gov)>  
**Subject:** New York Radiation Sites - EPA Action Levels for TAL Metals/Radiological parameters

Hi Eric,

I am preparing the NFB removal assessment trip report. I am at a point where I need to report the soil analytical results. Please can you confirm how you would prefer us to present the narrative below.

“Soil laboratory analytical results for radiological parameters were compared with the EPA's Site-Specific Action Level/Regional Screening Level (RSL)/Preliminary Remediation Goals (PRG).” - [Let's use the Site-Specific Action Level.] We have use these options to describe the criteria for our comparison in the past, but we need to stick to one. All of these terms mean different things at different time of

the assessment/removal phase. I think we are ok if we use Site-Specific Action Level from here until the end of removal. I'll verify with my office.

“Soil laboratory analytical results for TAL metals were compared with the EPA’s Removal Management Levels (RMLs)/Regional Screening Level (RSL)/Preliminary Remediation Goals (PRG).” - [Maybe RMSs? I'm not too familiar with non-rad terminology. Let me verify with folks in my office.] Currently the TAL metals results are compared with RMLs (not sure if this is actually what you want).

SAT did not present any narrative for TAL metals results in their report (attached) because there were no exceedance based on hazard ranking system, but we do not use this criteria for removal assessment.

Please see the report section under: Site Summary, second to last paragraph, details below: [This description of how the samples are analyzed, if it's the same as how SAT did it, it isn't correct. I know re-wrote this part in an earlier email (I think it was for the earlier SAT report) as the following:

"The soil samples were analyzed for various metals via ICP, mercury via cold vapor techniques, isotopic thorium and isotopic uranium via alpha spectrometry by DOE method A-01-R, radium-226 and radium-228 via gamma spectroscopy by DOE method GA\_01\_R."

If you could send me the current TestAmerica Laboratories report, I'll verify that these are the methods that they used. Sorry, the One Drive isn't working for me right now to grab the report.

“The soil samples were analyzed by TestAmerica Laboratories for Target Analyte List (TAL) metals analyses; isotopic thorium, isotopic uranium, radium-226, and radium-228 by alpha spectroscopy; and radioisotopes by gamma spectroscopy [Ref. 8, p. 2]. The slag samples were analyzed for isotopic thorium, isotopic uranium, radium-226, and radium-228 by alpha spectroscopy; and radioisotopes by gamma spectroscopy [Ref. 8, p. 2]. Analytical results indicate concentrations of radionuclides found in the slag and soil to be significantly higher than at background conditions (i.e., greater than 2x background concentrations) [Ref. 32, pp. 1–5; 36, pp. 10–33].” [Backgrounds should only be compared to scan only data (e.g. scanning an area using a sodium iodide and reporting in units of cpm) not analytical data (e.g. soil sample analyzed by a laboratory). I would leave out the "(i.e. greater than 2x background concentrations)" Statistically you would have to prove if the background is significantly greater than background conditions for analytical/soil data.

The statement in parenthesis is an extract from SAT’s report which cannot be re-written at this point. However, I agree with your narrative above of how the analytical methods should have written by SAT. Your narrative is consistent with

Test America's lab reports and also is consistent with the draft report we are still putting together for all the Rad sites which is as follow in blue:

The Soil samples were analyzed for TAL metals [Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)], in accordance with EPA SW846 Method 6010C; total mercury, in accordance with EPA SW846 Method 7471B; isotopic thorium (thorium-228, thorium-230 and thorium-232) and isotopic uranium (uranium-233/234, uranium-235/236 and uranium-238), in accordance with DOE alpha spectroscopy Health and Safety Laboratory (HASL)-300 Method A-01-R; Radium-226, Radium-226 (21 day ingrowth), Radium-228, and other gamma emitting radioisotopes, in accordance with DOE gamma spectroscopy HASL-300 Method GA-01-R. Aqueous rinsate blank samples were analyzed for TAL metals, in accordance with EPA SW846 Method 6010C; total mercury, in accordance with EPA SW846 Method 7471B; Isotopic thorium and isotopic uranium, in accordance with DOE alpha spectroscopy HASL-300 Method A-01-R; other gamma emitting radioisotopes, in accordance with DOE gamma spectroscopy Method GA-01-R; Radium-226, in accordance with EPA SW-846 Method 9315, and Radium-228 Gas Flow Proportional Counter (GFPC), in accordance with EPA SW-846 Method 9320.

Please advise. I am looking at the following EPA website; links below:

<http://www.cleanuplevels.com/>

<http://www2.epa.gov/risk/regional-removal-management-levels-chemicals-rmls-hq1-pdfs>

Thanks you.

**Ben Nwosu**

**Weston Solutions, Inc.**

RST3/ED

1090 King George Post Road, Suite 201

Edison, New Jersey 08837

Phone: (732) 585-4413

Cell: (908) 565-2980

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**From:** Nwosu, Bernard

**Sent:** Wednesday, November 18, 2015 4:29 PM

**To:** Nguyen, Lyndsey ([Nguyen.Lyndsey@epa.gov](mailto:Nguyen.Lyndsey@epa.gov))

**Cc:** [peter.lisichenko@westonsolutions.com](mailto:peter.lisichenko@westonsolutions.com); Benton, Tim

**Subject:** FW: HTC Data

Hi Lyndsey,

Please see my comments below. Pete will fill in the blanks for questions 1 and 2 since I was not on site during the sampling event. We will update Tables 8A & 9A with the EPA PRGs listed below and then update the figure accordingly, with highlighted exceedances above the EPA PRGs. I cannot promise an expedited delivery of this request, but we will do our best to get it to you as soon as possible.

Please let me know if you have any other questions.

Thanks,

**Ben Nwosu**  
**Weston Solutions, Inc.**  
RST3/ED2

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**From:** Nguyen, Lyndsey [mailto:Nguyen.Lyndsey@epa.gov]  
**Sent:** Wednesday, November 18, 2015 3:06 PM  
**To:** Nwosu, Bernard  
**Cc:** Daly, Eric  
**Subject:** RE: HTC Data

Hi Ben,

Sorry, I'm going to overload you with questions. I'll just list them out and feel free to answer next to the question:

1. When the soil samples were taken, did you take samples at every depth at each location (i.e. one sample at 0-12inches, one at 12-24inches, and another at 24-36 inches)?
2. If not, how did you determine which depth to take the sample? Was it random? Also, what happened to the rest of the sample that you didn't use? Was it just discarded?
3. What make the "slag" sample different from the "soil" sample? Could you visually see a difference? Or was the sample just taken by at specific depth (e.g. 0-6inches of soil depth was called "slag")? According to SAT's report, the slag samples were pieces of material suspected to be part of historic fill placed over native soil prior to paving the parking areas around the site with asphalt. SAT's report indicates that the soil samples were collected beneath the fill layer, which was at approximately 0-12 inches depth.
4. The data from SAT: Did they allow for ingrowth for Ra-226 data? Yes, you are correct.



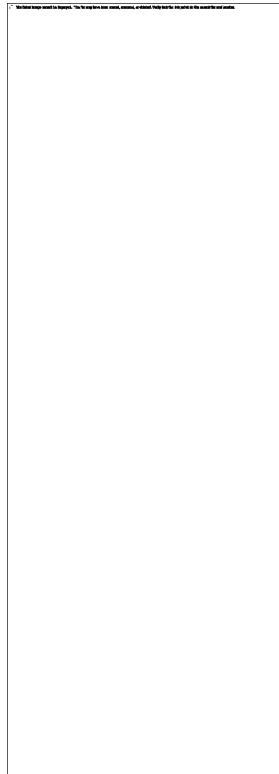
SAT analyses: Soil samples were analyzed for TAL metals via SW846, 6010C/7471B analytical methods; isotopic thorium, isotopic uranium, **radium-226, and radium-228, by alpha spectroscopy**; and radioisotopes by gamma spectroscopy. The slag samples were analyzed for isotopic thorium, isotopic uranium, **radium-226, and radium-228 by alpha spectroscopy**; and radioisotopes by gamma spectroscopy.

RST3 analyses: Soil samples were analyzed for TAL metals (including mercury) via SW846, 6010C/7471B analytical methods; isotopic thorium (thorium-228, thorium-230 and thorium-232) and isotopic uranium (uranium-233/234, uranium-235/236 and uranium-238) analyses via alpha spectroscopy Health and Safety Laboratory (HASL)-300-A-01-R; **Radium-226 and Radium-228 via alpha spectroscopy and gamma spectroscopy HASL-300-GA-01-R**; and radioisotopes were analyzed via gamma spectroscopy HASL-300-GA-01-R.

I only see one data point for Ra-226. Not sure about that. Each SAT sample location has data for Ra-226 both in the table and on the map. Please can you clarify your question.

5. The data from SAT: Did they not analyze for all of the same radionuclides as us? (I didn't see data for K-40, Cs-137, bismuth or lead isotopes) Yes, you are correct. They had a limited analyses list.

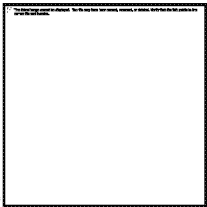
As far as products, I would love Figure 7 for HTC to include both soil and slag data (I didn't see the slag data in the last Figure 7) with the addition of 21 day ingrown Ra-226 data. Could you have both Ra-226 data and asterisk next to the one that was ingrown (just like the data)? Also could you make the values red for anything above these values for each radionuclide (this might change depending on the answers from the above questions):



Thanks for all of your help,

Lyndsey  
Lyndsey Nguyen  
Environmental Response Team-Las Vegas

Phone: 702.784.8018



Cell: 702-373-3756

Email: [Nguyen.Lyndsey@EPA.gov](mailto:Nguyen.Lyndsey@EPA.gov)



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**From:** Daly, Eric  
**Sent:** Wednesday, November 18, 2015 9:17 AM  
**To:** Nguyen, Lyndsey <[Nguyen.Lyndsey@epa.gov](mailto:Nguyen.Lyndsey@epa.gov)>  
**Subject:** Fwd: HTC Data

Hello Lyndsey. Can you take first crack at Bens questions below? I am in meetings.

Regards,  
Eric

"We must, indeed, all hang together, or assuredly we shall all hang separately",  
Benjamin Franklin  
Eric M. Daly  
On-Scene Coordinator/Radiological Response Specialist  
US Environmental Protection Agency- Region II  
ERRD/RPB/PPS  
2890 Woodbridge Avenue  
Edison, NJ 08837  
daly.eric@epa.gov  
732-321-4350

Begin forwarded message:

**From:** "Nwosu, Bernard" <[Ben.Nwosu@WestonSolutions.com](mailto:Ben.Nwosu@WestonSolutions.com)>  
**Date:** November 18, 2015 at 11:35:36 AM EST  
**To:** "Daly, Eric" <[Daly.Eric@epa.gov](mailto:Daly.Eric@epa.gov)>  
**Subject:** RE: HTC Data

Eric,

Please confirm:

For HTC Figure 7, do you want us to present only the results for Radium-226 and Radium-228, **without highlighting any presumed exceedances**, like we did with NFB?

Your question regarding top layer hot spots:

Most of the locations sampled by RST 3 were in the 0-12 inches depth interval except for location H001-SS007, which was sampled at the 6-18 inches depth.

Most of the locations sampled by SAT for soil (S0) were in the 24-36 inches depth interval except for location S01(18-30). Two slag samples, SG02 and SG03 were collected at 6-12 inches depth and SG01 from 0-6 inches depth.

I have updated Table 9 to 9A (without highlighting exceedances). We may have to update it again when Lyndsey provides us with the EPA site-specific action levels; probably, that is when we should decide if to present only Radium-226/228 as drivers for a removal action. Please let me know your thoughts?

Thanks,

**Ben Nwosu**  
**Weston Solutions, Inc.**  
RST3/ED2

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**From:** Daly, Eric [<mailto:Daly.Eric@epa.gov>]  
**Sent:** Wednesday, November 18, 2015 10:38 AM  
**To:** Nwosu, Bernard  
**Subject:** RE: HTC Data

I almost forgot. Can you verify that all the NFB SAT soil data is presented in both tables and figures? I think we went over this already with those files and now just doing the same with HTC. Lyndsey questioned yesterday and I wanted to be sure. Thanks again.

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**From:** Nwosu, Bernard [<mailto:Ben.Nwosu@WestonSolutions.com>]  
**Sent:** Wednesday, November 18, 2015 10:16 AM  
**To:** Daly, Eric <[Daly.Eric@epa.gov](mailto:Daly.Eric@epa.gov)>  
**Subject:** RE: HTC Data

Ok. Thanks.

**Ben Nwosu**  
**Weston Solutions, Inc.**  
RST3/ED2

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**From:** Daly, Eric [<mailto:Daly.Eric@epa.gov>]  
**Sent:** Wednesday, November 18, 2015 9:39 AM  
**To:** Nwosu, Bernard  
**Subject:** Re: HTC Data

Thanks Ben. I hope I made sense. We basically need to show top layer which should be hot spots.  
Regards,  
Eric

"We must, indeed, all hang together, or assuredly we shall all hang separately", Benjamin Franklin  
Eric M. Daly  
On-Scene Coordinator/Radiological Response Specialist  
US Environmental Protection Agency- Region II  
ERRD/RPB/PPS  
2890 Woodbridge Avenue

Edison, NJ 08837  
daly.eric@epa.gov  
732-321-4350

On Nov 18, 2015, at 8:51 AM, Nwosu, Bernard  
<[Ben.Nwosu@WestonSolutions.com](mailto:Ben.Nwosu@WestonSolutions.com)> wrote:

Good morning Eric,

We will take care of this and get back to you.

Thanks,

**Ben Nwosu**  
**Weston Solutions, Inc.**  
RST3/ED2

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**From:** Daly, Eric [<mailto:Daly.Eric@epa.gov>]  
**Sent:** Tuesday, November 17, 2015 5:28 PM  
**To:** Nwosu, Bernard  
**Subject:** HTC Data  
**Importance:** High

Hi Ben:

Can you please revise HTC like NFB. Meaning, tables and figures show the "slag" layer values. Unless they didn't sample those depths in certain samples? For example, Figure 7 Sample S-02 only shows 24-36 inches. Table 9, all samples listed are the deeper depths. Once we see all the data, Lyndsey determine cleanup limits. We need all the radionuclides.

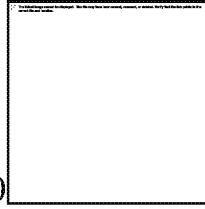
Thanks

Regards,  
Eric

"We must, indeed, all hang together, or assuredly we shall all hang separately", Benjamin Franklin  
Eric M. Daly  
On-Scene Coordinator/Radiological Response Specialist  
US Environmental Protection Agency- Region II  
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<CRU\_Table 8A\_Rad Soil Analytical Results.pdf>

<NFB\_Table 8A\_Rad Soil Analytical Results.pdf>

<HTC\_Table 8A\_Rad Soil Analytical Results.pdf>

<CRU\_Table 9\_SAT Rad Soil Analytical Results\_rev01.pdf>

<NFB\_Table 9\_SAT Rad Soil Analytical Results.pdf>

<HTC\_Table 9\_SAT Rad Soil Analytical Results.pdf>